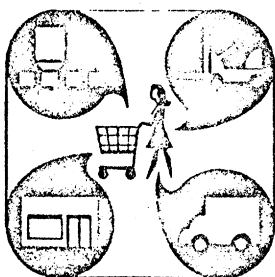


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ALTERNATIVES FOR REDUCING WATER POLLUTION IN CATTLEHIDE PROCESSING AND TANNING



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ALTERNATIVES FOR REDUCING WATER POLLUTION IN CATTLEHIDE PROCESSING AND TANNING

by

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ABSTRACT: The cattlehide processing and tanning industry must adjust to new Federal water pollution standards. Alternative marketing practices by processors and tanners can eliminate salt and reduce other pollutants discharged in sewage. The alternatives studied involve a combination of omitting salt curing, relocating tannery beamhouse operations, and changing the form of product marketed from salt cured hides to an intermediate leather product. Changes suggested will not affect the quality or quantity of cattlehide leather products

KEYWORDS: Cattlehides, leather tanning, water pollution.

Processing and tanning cattlehides is a major livestock byproduct industry in the United States. In 1972, nearly 37 million salt-cured cattlehides (about 1.35 million tons, fresh weight) were sold—about 17 million as exports and about 20 million to the domestic tanning industry. Cattlehides sales for tanning and exports generated almost \$1 billion in gross revenues to cattle slaughtering operations.¹

Water Pollution from Curing and Tanning Cattlehides

Pollution of the environment from hide curing and tanning is a serious national and local concern. New Federal standards for industrial waste discharges will require hide processors and tanners to make substantial investments in water treatment facilities if alternative solutions to the problems are not found.²

Hide processors must dispose of salt water (brine) and other wastes resulting from washing, fleshing, demanuring, trimming, and salting fresh hides. A typical 50-pound salt-cured hide contains 8 to 9 pounds of salt. An additional 4 to 5 pounds of salt are dissolved in the 1½ gallons of water lost by a fresh hide during the curing process. This brine is the main cause of water pollution. Offal, such as flesh and trimmings, is rendered for feed or is disposed of with solid wastes.

Tanneries also use large volumes of water to discharge beamhouse wastes from processes that desalt, dehair, lime, bate, pickle, and chrome tan salt-cured hides. Tanneries recover and market a part of these wastes, mainly hair and trimmings from hides, but most waste is disposed of in sewage. Suitable techniques to recover salt from hide-curing and tanner effluents have not been found.

Alternative Processing and Tanning Operations to Reduce Pollution

Research by the Economic Research Service and the Agricultural Research Service on cattlehide processing and leather tanning operations shows

¹U.S. Dept. of Commerce and Tanners Council statistics.

²*Standards of Leather Tanning and Finishing: Industrial Waste Control Guidelines.* Environmental Protection Agency, Washington, D.C., Oct. 1973.

that a combination of (1) omitting salt-curing, (2) relocating tannery beamhouse operations to locations near sources of fresh hides, and (3) changing the form of the product marketed from salt-cured hides to an intermediate leather product such as blue, chrome-tanned leather or crust leather may offer solutions to water pollution problems of the industry. The solutions, however, would require major changes in the sequence of operations, materials used, and form of hide product sold by hide processors.

In order to eliminate salt-curing, it is necessary to preserve fresh hides in some other way at slaughtering plants. One alternative is for hide processors to partially tan fresh hides to blue, chrome-tanned leather, an intermediate product often stored for varying periods of time in present tannery practices. This would require the transferring of tannery beamhouse functions to hide processors. Tanners would no longer need to operate beamhouses but would buy chrome-tanned leather from hide processors for processing into fully tanned and finished leather products (table 20, Alternative I).

As a second alternative, hide processors could take over the entire tanning operation and locate it at or near the source of fresh hides. Hide processors would make and sell fully tanned (crust) leather for finishing.

Commercial Tests

A study was made with a commercial firm to simulate alternatives I and II. Material and economic impacts were observed and measured.³ A commercial lot of 300 fresh, washed, fleshed, and trimmed hides (10 tons) was processed, half by present industry practices and half to simulate alternatives I and II (table 20).⁴

Chrome-tanned leather was made from matched lots of cattlehides sides, one lot with salt-curing, the other lot without salt-curing. Test results show that processing of fresh hide to leather without salt-curing is commercially feasible with presently available processing technology and equipment.

At the blue sort step, the chrome-tanned leather in each lot was measured for quality and yield. Grading results for 252 matched pairs of sides revealed no

significant difference in quality of chrome-tanned leather made from salt-cured hides versus the fresh hide material (table 21).⁵

Industry Adjustments

Some hide processors presently make blue, chrome-tanned leather as a service for tanners, adding a service charge for custom beamhouse processing of hides. However, salt-cured rather than fresh hides are used in most instances as a starting material, because tannery buying practices are based on prices and grades for salted hides.

The new technology of omitting salt-curing of hides introduces several problems for the hide and leather tanning industry. Some major interrelated problems are!

- (1) Marketability of chrome-tanned leather is not yet well defined. Standards for grading blue, chrome-tanned leather to suit tanners will have to be developed for open market transactions between tanneries and firms making blue, chrome-tanned leather from fresh hides.
- (2) Hide processors will need to replace hide-curing facilities with beamhouse operations, which will involve investing in new equipment and processing technology. Skilled labor will need to be trained and relocated.
- (3) Tanners, by phasing out hideroom and beamhouse operations, would lose internal quality control of hide material used for leather making.
- (4) If foreign buyers continue to require salt-cured hides from U.S. sources, salt-curing facilities will have to be maintained by hide processors to supply hides for the export market.

The livestock slaughtering industry depends on domestic and foreign tanneries as a market for hides. If water pollution abatement costs force a significant part of the present tanning industry to cease operations, and if the water pollution standards for hide curing with salt cannot be met, the slaughtering industry will be forced to find other outlets for hides. Adjustment to alternative II then would be most likely to occur. Crust leather would be made and sold to finishers, or to leather goods manufacturers who would have it finished according to their specifications.

³This report presents comparative quality measures. Analysis is underway to characterize the costs of processing hides to leather under alternatives I and II. These findings will be made available at a later date.

⁴Spencer Beef Packing Company and Wisconsin Leather, Divisions of Spencer Food Company, Inc., Spencer, Iowa, furnished materials, facilities, and services for the commercial test by ERS/ARS, USDA in September and October, 1973. Herbert H. Moede, ERS, USDA, Washington, D.C., also participated in planning and conducting the test and analyzing results.

⁵The test continued through processing to crust and finished leather by the tannery. USDA will conduct laboratory analyses for quality and performance differences on leather samples from salted and unsalted hides as blue, chrome-tanned, crust, and finished leather. Results will not become available for release until storage stability test periods of 3 to 5 months are completed.

Table 20-Sequence of present and alternative cattlehide-to-leather processing and marketing systems.

Processing and marketing functions	: Present : : industry : : practice :	: Alternative : I	: Alternative : II
Buy fresh hides (hide processor)	X	X	X
Hidehouse			
Wash, demanure, flesh, trim	X	X	X
Brine cure	X		
Wring	X		
Class, weigh, tie, palletize	X		
Store	X		
Sell salted hides	X		
Buy salted hides (tannery)	X		
Hideroom			
Receive, store, sort, retrim	X		
Side	X <u>1/</u>		
Beamhouse			
Soak, wash, dehair, bate	X	X	X
Sort, retrim, split	X <u>1/</u>	X <u>1/</u>	X <u>1/</u>
Relime, bate, pickle, chrome tan	X	X	X
Wring and set-out	X	X	X
Blue sort	X	X	X
Side	X <u>1/</u>		X <u>1/</u>
Pallet, wrap, store		X	
Sell blue chrome tanned leather		X	
Buy blue chrome tanned leather (tannery) ...		X	
Receive, store		X	
Laboratory analysis		X	
Wring and set-out		X	
Side and retrim		X	
Blue sort		X	
Split and shave	X <u>1/</u>	X <u>1/</u>	X <u>1/</u>
Tan and dyehouse			
Retan, dye, fat liquor	X	X	X
Set-out and paste dry	X	X	X
Take-off, stack, condition	X	X	X
Stake	X	X	X
Buff	X	X	X <u>1/</u>
Crust sort	X	X	X
Measure, pack, mark, store			X
Sell crust leather			X
Buy crust leather (finisher or leather goods manufacturer)			
Receive, measure, sort, store			X
Buff			X <u>1/</u>
Finishing			
Color and plate	X	X	X
Sort and measure	X	X	X
Pack, mark, store	X	X	X
Sell leather	X	X	X

1/ Optional step at this point.

Table 21.--Quality and yield of blue, chrome-tanned leather made from matched pairs of salted and fresh cattlehide sides 1/

Blue chrome tanned leather made from--					
Salt cured sides			Fresh sides		
Grade	Number		Grade	Number	Score <u>2/</u>
A	11		A	--	--
			B	1	-1
			C	10	-20
			D	--	--
B	65		A	3	3
			B	15	--
			C	43	-43
			D	4	-8
C	148		A	3	6
			B	45	45
			C	92	--
			D	8	-8
D	28		A	-	-
			B	3	6
			C	13	13
			D	12	--
Total	252			252	-7

1/ After processing, all sides were sorted for grade and weight by the tanneries regular blue sort procedure. Hide number, left or right side, and sorter's grade were recorded for each side by USDA personnel as it passed from the sorting table to stacks. After sorting was completed, grading results for each cattlehide were compared. For example, 148 sides from the salt-cured lot received grade C at blue sort. Sides from the same animals that were processed without salt graded as follows: 3 grade A, 45 grade B, 92 grade C, and 8 grade D. Quality comparisons were made for 252 pairs of cattlehide sides. Forty-eight pairs of sides could not be evaluated because of incomplete identification.

2/ Each side scored 0 if grade letter was the same. The fresh side scoring was -1 for each letter grade lower and 1 for each letter grade higher than the salt-cure side of the pair.

Pollution Abatement Effects

The potential costs of pollution abatement facilities will strongly encourage changes in the present hide processing and marketing system for cattlehides and leather. Both alternatives I and II eliminate salt-curing, a major source of water pollution for hide processors and tanners.

An estimated 260,000 tons of salt were used to preserve cattlehides in 1972. More than two-thirds of this was discharged into fresh waters.⁶ Eliminating

⁶About 90,000 tons of salt went out of the United States in exports of salt-cured cattlehides.

salt curing would, at the same time, reduce pollution and cause a cost saving for salt of about 10 cents per hide, or \$3.7 million. In addition, there may be possible savings in labor costs by the elimination of curing.

Fat, fleshings, hair, and hide trimmings that come from a beamhouse operation near a slaughter plant can be handled with a small addition to existing packinghouse waste treatment and byproduct rendering systems. Some of the waste material from tanneries can be converted to marketable byproducts at a packinghouse rendering facility.